

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 4851 (1987): Proforma for Estimating Unit Rate of Concrete Used in Mechanized Construction of River Valley Projects [WRD 23: Measurement and Cost Analysis of Works For River Valley Projects]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



IS : 4851 - 1987

Indian Standard

**PROFORMA FOR ESTIMATING UNIT RATE OF
CONCRETE USED IN MECHANIZED
CONSTRUCTION OF RIVER VALLEY PROJECTS
(*Second Revision*)**

UDC 627.81.057.003.12 (624.012.4) : 651.72

© Copyright 1987

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

PROFORMA FOR ESTIMATING UNIT RATE OF CONCRETE USED IN MECHANIZED CONSTRUCTION OF RIVER VALLEY PROJECTS

(Second Revision)

Cost Analysis and Cost Estimates Sectional Committee, BDC 63

Chairman

SHRI S. N. AGNIHOTRI
710 Sector 11-B,
Chandigarh

Members

SHRI S. N. ADHIKARI

SHRI N. K. MAZUMDAR (*Alternate*)

CHIEF ENGINEER (MEDIUM IRRIGATION & DESIGNS) Irrigation & Power Department, Government of Andhra Pradesh, Hyderabad

ADDITIONAL CHIEF ENGINEER (*Alternate*)

CHIEF ENGINEER (SPECIAL PROJECT) Irrigation Department, Government of Maharashtra, Pune

SUPERINTENDING ENGINEER (*Alternate*)

CHIEF ENGINEER (TDC) Irrigation Works, Government of Punjab, Chandigarh

DIRECTOR (PD) (*Alternate*)

DIRECTOR Karnataka Power Corporation Ltd, Bangalore

DIRECTOR (CMG) Central Water Commission, New Delhi

DEPUTY DIRECTOR (CMC) (*Alternate*)

DIRECTOR (R&C) Central Water Commission, New Delhi

DEPUTY DIRECTOR (R&C) (*Alternate*)

SHRI J. DURAIRAJ In personal capacity (DI/141, Satya Marg, New Delhi)

EXECUTIVE ENGINEER (CIVIL) Kerala State Electricity Board, Trivandrum

SHRI P. C. GANDHI Bhakra Beas Management Board, Sunder Nagar

SHRI H. S. NARULA (*Alternate*)

SHRI R. M. GUPTA Roads Wing, Ministry of Shipping & Transport, New Delhi

SHRI R. S. MAHALAHA (*Alternate*)

(Continued on page 2)

© Copyright 1987

BUREAU OF INDIAN STANDARDS

This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(Continued from page 1)

Members

SHRI S. S. IYENGAR
SHRI S. B. JOSHI
SHRI C. B. DHOPATE (*Alternate*)
SHRI A. V. KHANDEKAR
SHRI A. B. AHERKAR (*Alternate*)
SHRI A. B. L. KULSHRSHETHA
SHRI S. R. NIGAM (*Alternate*)
SHRI SAMIR LAHIRI
SHRI SUJIT SEN (*Alternate*)
SHRI Y. G. PATEL
SHRI A. S. SEKHON
SHRI K. SRINIVASAN
SHRI KAMAL NAYAN TANEJA
SHRI B. CHOUDHURY (*Alternate*)
SHRI S. G. TASKAR
SHRI D. A. KOTHARI (*Alternate*)
SHRI M. THYAGARAJAN

SHRI G. RAMAN,
Director (Civ Engg)

Representing

M. N. Dastur & Co (P) Ltd, Calcutta
S. B. Joshi & Co Ltd, Bombay

The Hindustan Construction Co Ltd, Bombay

Bureau of Public Enterprises, New Delhi

Continental Construction Ltd, New Delhi

Patel Engineering Co Ltd, Bombay
Institution of Engineers, Chandigarh
Directorate General Border Roads, New Delhi
National Project Construction Ltd, New Delhi

Construction Consultation Service, Bombay

Indian Institute of Public Administration,
New Delhi
Director General, BIS (*Ex-officio Member*)

Secretary

SHRI M. SADASIVAM
Assistant Director (Civ Engg), BIS

Indian Standard

PROFORMA FOR ESTIMATING UNIT RATE OF CONCRETE USED IN MECHANIZED CONSTRUCTION OF RIVER VALLEY PROJECTS

(Second Revision)

0. FOREWORD

0.1 This Indian Standard (Second Revision) was adopted by the Indian Standards Institution on 25 February 1987, after the draft finalized by the Cost Analysis and Cost Estimates Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 This standard was first published in 1968 and was revised in 1978 to incorporate certain modifications in Table 1 with a view to rationalizing the major operational characteristics and in this second revision Appendices A and B have been excluded. The method of calculation of depreciation and the estimated life of plant and machinery used in concrete is covered in IS : 11590 (Part 1)-1986*.

0.3 Unit rates of concrete available from various river valley projects in the country differ so widely in their structure that comparison of rates becomes impracticable. The variation in the unit rate of particular type of concrete occurs due to several factors, such as situation of work, wages of labourers, specifications of materials, cost of machinery and their repair charges, productivity, etc. It is, therefore, felt necessary to prepare a proforma for the estimation of the unit rate of concrete in such a manner as would take into account all the elements of costs that are expected to go into the item rate and present them in a uniform pattern so that the rates obtained in different projects can be compared and the item/items of operation showing differences is/are identified and understood.

0.4 The proforma has been drawn up operation-wise, and, as such, the depreciation of machinery, wages of labour including supervisory labour, etc, have all been taken into account in the costs of various operations indicated in the proforma.

*Guidelines for working out unit rate of the construction equipment used for river valley projects: Part 1 General.

0.5 The proforma presents the costs of different operations in their final shape. It does not show the details of the break-up of the cost of each operation. Besides this final proforma, a number of other proformae would be required to analyse and work out the costs of the different operation and elements that are indicated here in the final proforma. These supporting proformae have to be drawn up by the concerned project authorities or construction agencies according to their requirements and necessities.

0.6 Separate rates will, however, be worked out for each type of concrete which should be specified in the beginning of the proforma.

0.7 There are different practices followed in the country in regard to inclusion of costs of shuttering and reinforcement in the computation of unit rate of concrete. The general consensus was that since shuttering is a very important item a separate proforma should be brought out. Accordingly a separate standard IS : 10421-1983* has been prepared for computing the unit rate of shuttering.

1. SCOPE

1.1 This standard lays down the proforma for estimating unit rate of concrete used in mechanized construction of river valley projects.

2. PROFORMA FOR UNIT RATE OF CONCRETE

2.1 The proforma recommended for use in estimating unit rate of concrete for river valley project is as given in Table 1.

TABLE 1 PROFORMA FOR ESTIMATING UNIT RATE OF CONCRETE
(Clauses 0.2 and 2.1)

Sl No.	ITEM	UNIT	QUANTITY	RATE	AMOUNT	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Coarse aggregates:					
a)	Royalty and other fees for quarrying					
b)	Removal of overburden					
c)	Quarrying:					
	1) Drilling					
	2) Blasting					

(Continued)

*Proforma for analysis of unit rate of shuttering, form work for concrete items.

**TABLE 1 PROFORMA FOR ESTIMATING UNIT RATE
OF CONCRETE — Contd**

Sl No.	ITEM	UNIT	QUANTITY	RATE	AMOUNT	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	3) Mucking					
	4) Dewatering (if required)					
	d) Transport to crushers					
	e) Crushing and processing and conveyance to stockpiles					
	f) Transport from stockpiles to batching plant					
	g) Losses in transit, storage, handling, etc (percent)					
ii)	<i>Sand (fine aggregates):</i>					
	a) Royalty and other fees for quarrying					
	b) Removal of overburden					
	c) Quarrying or crushing and processing					
	d) Grading and washing					
	e) Transport to site					
	f) Transport from stockpiles to batching plant					
	g) Losses in transit, storage, handling, etc (percent)					
iii)	<i>Cement:</i>					
	a) Cost ex-factory					
	b) Rail or road transport and handling to site of work					
	c) Storage and handling up to batching plant					
	d) Losses in transit, storage, handling, etc (percent)					
iv)	<i>Admixture:</i>					
	a) Cost ex-factory					
	b) Rail or road transport and handling to site of work					
	c) Storage and handling up to batching plant					
	d) Losses in transit, storage, handling, etc (percent)					

(Continued)

**TABLE 1 PROFORMA FOR ESTIMATING UNIT RATE
OF CONCRETE — Contd**

SL No.	ITEM	UNIT	QUANTITY	RATE	AMOUNT	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)
v)	<i>Batching, mixing, laying and curing:</i>					
a)	Cleaning and preparation of construction joints					
b)	Batching and mixing					
c)	Placing:					
	1) Transport from batching plant					
	2) Placing					
	3) Vibrating and					
	4) Green cutting/finishing					
d)	Curing					
e)	Water					
f)	Wastage (percent)					
vi)	<i>Other items:</i>					
a)	Cooling system:					
	1) Pre-cooling plant:					
	i) Cost of plant					
	ii) Operation cost					
	2) Embedded system:					
	i) Cost of the system					
	ii) Operation cost					
vii)	<i>Overheads:</i>					
	Proportional cost of the following overheads should be added to the item of unit rate concrete:					
a)	Field set up:					
	1) Buildings					
	2) Water supply, lighting, sanitary and drainage					
	3) Service road					
	4) Temporary constructions					
b)	Field charges:					
	1) Establishment expenditure (salary and office-expenditure, inspection, vehicles, etc)					

(Continued)

**TABLE 1 PROFORMA FOR ESTIMATING UNIT RATE
OF CONCRETE — Contd**

SL No.	ITEM	UNIT	QUANTITY	RATE	AMOUNT	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2) Compensation, retrenchment compensation, bonus, etc					
	3) Worksite amenities (medical, education, recreation, etc)					
	4) Survey					
	5) Testing					
	6) Small T&P					
	7) Maintenance					
	8) Carriage and freight of machinery					
	9) Contingencies					
c)	Head office and financial expenses					
	1) Dividend/return on capital					
	2) Interest charges					
	3) Head office changes including subordinate controlling offices					
	4) Profit envisaged					

Total all — in rate

NOTE 1 — The overhead expenses may be included as percentage of prime cost [Items (i to vi)]

NOTE 2 — All the items mentioned above shall include depreciation, erection, operation and repairs, maintenance and dismantling of machinery where used. Unit rates of these can be estimated as per IS : 11590 (Part 1)-1986*.

*Guidelines for working out rate of the construction equipment used for river valley project: Part 1 General.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane Angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	$1 \text{ N} = 1 \text{ kg.m/s}^2$
Energy	joule	J	$1 \text{ J} = 1 \text{ N.m}$
Power	watt	W	$1 \text{ W} = 1 \text{ J/s}$
Flux	weber	Wb	$1 \text{ Wb} = 1 \text{ V.s}$
Flux density	tesla	T	$1 \text{ T} = 1 \text{ Wb/m}^2$
Frequency	hertz	Hz	$1 \text{ Hz} = 1 \text{ c/s (s}^{-1}\text{)}$
Electric conductance	siemens	S	$1 \text{ S} = 1 \text{ A/V}$
Electromotive force	volt	V	$1 \text{ V} = 1 \text{ W/A}$
Pressure, stress	pascal	Pa	$1 \text{ Pa} = 1 \text{ N/m}^2$

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones: 331 01 31, 331 13 75

Telegrams: Manaksanstha
(Common to all Offices)

Regional Offices:

Telephone

*Western : Manakalaya, E9 MIDC, Marol, Andheri (East), BOMBAY 400093	6 32 92 95
†Eastern : 1/14 C.I.T. Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054	36 24 99
Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036	{ 2 18 43 3 16 41
Southern : C.I.T. Campus, MADRAS 600113	{ 41 24 42 41 25 19 41 29 18

Branch Offices:

'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMADABAD 380001	{ 2 63 48 2 63 49
'F' Block, Unity Bldg, Narasimharaja Square, BANGALORE 560002	22 48 05
Gangotri Complex, 5th Floor, Bhadbhada Road, T.T. Nagar, BHOPAL 462003	6 67 16
Plot No. 82/83, Lewis Road, BHUBANESHWAR 751002	5 36 27
53/5, Ward No. 29, R. G. Barua Road 5th Byelane, GUWAHATI 781003	—
5-8-56C L.N. Gupta Marg (Nampally Station Road), HYDERABAD 500001	23 10 83
R14 Yudhister Marg, C Scheme, JAIPUR 302005	{ 6 34 71 6 98 32
117/418 B Sarvodaya Nagar, KANPUR 208005	{ 21 68 76 21 82 92
Patliputra Industrial Estate, PATNA 800013	6 23 05
Hantex Bldg (2nd Floor), Rly Station Road, TRIVANDRUM 695001	7 66 37

Inspection Offices (With Sale Point):

Pushpanjali 205-A West High Court Road, Bharampeth Extension, NAGPUR 440010	2 51 71
Institution of Engineers (India) Building, 1332 Shivaji Nagar, PUNE 411005	5 24 35

*Sales Office in Bombay is at Novelty Chambers, Grant Road,
Bombay 400007 89 65 28

†Sales Office in Calcutta is at 5 Chowringhee Approach, P.O.
Prinsep Street, Calcutta 700072 27 68 00